CROSS-COUPLING REACTION OF ORGANOSILICON NUCLEOPHILES

CROSS-REFERENCE TO RELATED APPLICATIONS

This application takes priority under 35 U.S.C. 119(e) from U.S. provisional application Serial No. 60/209,682, filed June 6, 2000 which is incorporated in its entirety by reference herein.

STATEMENT OF FEDERAL SUPPORT

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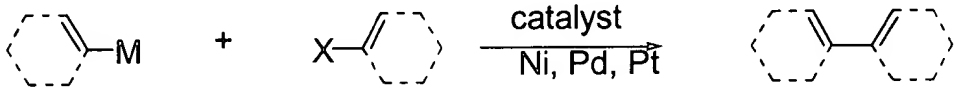
BACKGROUND OF THE INVENTION

Metal-catalyzed, cross-coupling reactions have, in general, become an important synthetic tool for the construction of carbon-carbon bonds (Scheme 1) (1, 2).

Scheme 1



M = Li, MgX, AlR_2, ZnX
BR_2, SnR_3

This fundamental transformation has been demonstrated to occur with a variety of organometallic nucleophiles and organic electrophiles typically catalyzed by Ni or Pd. The Suzuki coupling of organoboranes (3) and the Stille (Migita-Kosugi) coupling of organostannanes (4), for example, employ stable, isolable reagents that are extremely weak nucleophiles with good functional group compatibility. Cross-coupling reactions (1, 2) can be used, for example, to construct biaryl subunits which are a commonly found in biologically active molecules (5). Biaryl-containing compounds are also useful in the design of new compounds including organic semiconductors and liquid crystals (6). Existing methods and reagents for metal-catalyzed cross-coupling reactions, however, have some disadvantages, including attenuated and substrate-dependent reactivity, oxygen-sensitivity, high molecule weight and toxicity, which limit their utility and scope of application.

There is continuing interest in the development of new cross-coupling reactions that employ milder procedures and have broader structural generality. Desirable aspects of improved cross-coupling reactions include:(1) increased ease of preparation of the reagents (2) mildness of reaction conditions (3) stereospecificity of reaction (4) functional group compatibility and (5) tractability of by-products.